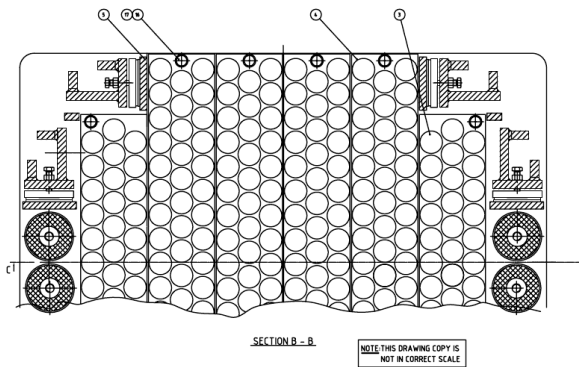


Heavy duty spring isolators



ALL METAL VIBRATION ISOLATORS

Description

Our custom made spring vibration isolators are designed for outdoor offshore and marine installations. The steel structure is often manufactured in steel S355J2G3 and painted according to offshore specifications. All other steel parts are typically in stainless steel AISI 316 covered with wax OKS2000.

Characteristics

The spring isolators are optimized for a very low resonance frequency, high environmental demands and external forces such as wind, waves, accidental loads etc.

Depending on the choice of springs resonance frequencies from 3 to 6 Hz can be achieved.

The stiffness can be tuned by pre-compressing the builtin snubbers. This will also add damping to the isolators resulting in a lower amplification factor.

Maximum excitation amplitude: ± 1 mm

Temperature range: -90 °C to $+300$ °C

Technical documentation

We provide extensive technical support in the use of our products and systems. This can include:

- Material certificates (related to project requirements, lab tests etc.)
- Engineering results (computer calculations, on-site support etc.)
- Drawings in AutoCAD or Inventor (2D installation plans, 3D presentations etc.)
- Tests to evaluate mechanical and long-term behavior.
- Manuals for maintenance and installation.
- Welding licenses and weighting certificates.

Calculations

With an extensive experience in the field, combined with use of modern tools, Vibratec are able to custom design spring isolators that meets high requirements of vibration isolation. Necessary calculations to ensure the performance of the system are regularly carried out. This can include:

- Mechanical strength analysis by Finite Element Methods (FEM).
- Modal analysis by use of Statistical Energy Analysis (SEA) or Finite Element Methods (FEM).
- Load distribution calculations.
- Fatigue calculations.
- Resonance frequency and attenuation calculations.
- Calculation of fastening bolts or welds.

Application

Elastic suspension of rotating machinery at >600 rpm - fans, compressors, generator sets, reciprocating machinery etc.

Protection of turbines, accommodation and office modules from vibrations and impacts.

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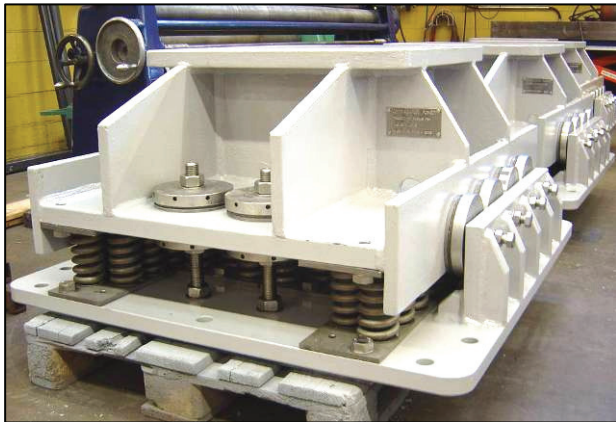
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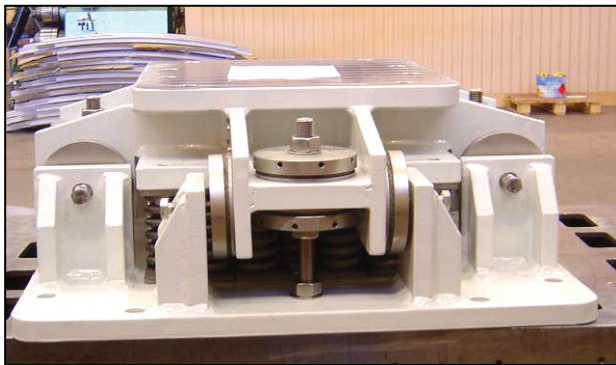
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Selection of reference



GE Package Power – Petrobras P54 2005

Four sets of 3-point elastic suspension for Gas Turbine Generator sets (155 tons each) to reduce the vibrations transmitted to the deck structure and protecting the turbine itself from external vibrations. Resonance frequency of the isolators was designed to be 3.3 Hz. The AVM-design was based on ABS Guide for Building and Classing Floating Production Installations rev 2004, and painting was done in accordance to Petrobras specifications. The FPSO P-54 is now in service at the Roncadore Field, Campos Basin, Brazil.



Wärtsilä – Total Rosa Liro 2004

Two sets of 3-point elastic suspension of Diesel Generator sets with operational weight 102 tons. The spring isolators were designed for a static deflection of 23 mm resulting in a resonance frequency of 3.3 Hz. The steel structure and movement limiters were designed for simultaneous accelerations in x-, y- and z-directions corresponding to ULS and ALS-loads. Steel structure and painting was done according to NORSOK. The final destination was a platform for deepwater oil drilling in the Rosa/Liro field in Angola.



Aibel – Ettrick Aoka Mizu FPSO 2007

In total 16 spring isolators for elastic suspension of 2 HP Compressor sets (301 tons each) and 2 LP Compressor sets (186 tons each). The AVMs' were designed according to the principal rules of the DNV Offshore Standards where Accidental Limit State, Ultimate Limit State and Fatigue Limit State were taken into account. The resonance frequency of the isolators was calculated to be 3.5 Hz. Furthermore the resonance frequency of the steel structure were calculated to be above 150 Hz to ensure minimal risk of internal resonances. The AVMs' were equipped with extra locking devices as they were to be pre-compressed and installed under an existing structure. When put in place the pre-compression was released and the AVMs' raised to carry their design load. The elastic suspension was also complemented with visco-elastic dampers. The FPSO Aoka Mizu is today located at the Ettrick field, approximately 65 km North-East of Peterhead.